Name: _____ Class: _____ Date: _____

Surface and Volume of Prisms

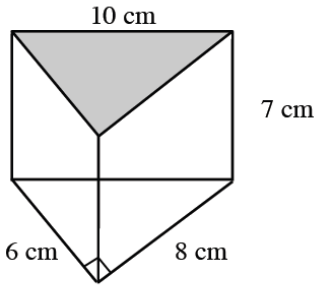
SURFACE AREA OF A PRISM

The surface area of a prism is the sum of the areas of all of the faces, including the bases. Surface area is expressed in square units.

For additional information, see the Math Notes boxes in Lessons 9.2.1 and 9.2.2 of the *Core Connections, Course 1* text and Lesson 9.2.4 of the *Core Connections, Course 2* text.

Example

Find the surface area of the triangular prism at right.



Step 1: Area of the 2 bases: $2\left[\frac{1}{2}(6\text{ cm})(8\text{ cm})\right] = 48\text{ cm}^2$

Step 2: Area of the 3 lateral faces

Area of face 1: $(6\text{ cm})(7\text{ cm}) = 42\text{ cm}^2$
Area of face 2: $(8\text{ cm})(7\text{ cm}) = 56\text{ cm}^2$
Area of face 3: $(10\text{ cm})(7\text{ cm}) = 70\text{ cm}^2$

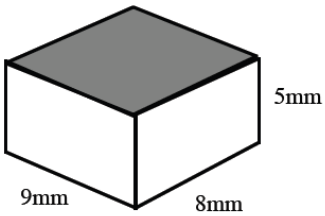
Step 3: Surface Area of Prism = sum of bases and lateral faces:

$SA = 48\text{ cm}^2 + 42\text{ cm}^2 + 56\text{ cm}^2 + 70\text{ cm}^2 = 216\text{ cm}^2$

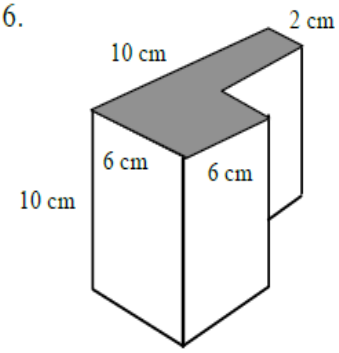
Problems

Find the surface area of each prism.

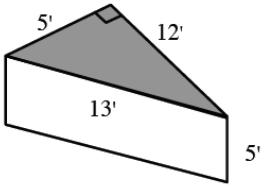
1.



6.



3.



VOLUME OF A PRISM

Volume is a three–dimensional concept. It measures the amount of interior space of a three-dimensional figure based on a cubic unit, that is, the number of 1 by 1 by 1 cubes that will fit inside a figure.

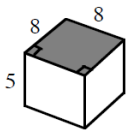
The volume of a prism is the area of either base (B) multiplied by the height (h) of the prism.

$$V = \text{(Area of base)} \cdot \text{(height)} \quad \text{or} \quad V = Bh$$

For additional information, see the Math Notes boxes in Lesson 9.2.1 of the *Core Connections, Course 1* text and Lesson 9.2.4 of the *Core Connections, Course 2* text.

Example 1

Find the volume of the square prism below.

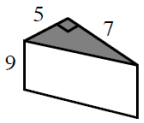


The base is a square with area (B)
$8 \cdot 8 = 64$ units^2.

Volume $= B(h)$
$= 64(5)$
$= 320$ units^3

Example 2

Find the volume of the triangular prism below.



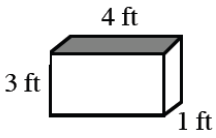
The base is a right triangle with area
$\frac{1}{2}(5)(7) = 17.5$ units^2.

Volume $= B(h)$
$= 17.5(9)$
$= 157.5$ units^3

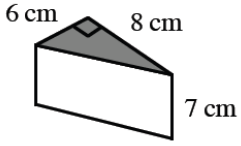
Problems

Calculate the volume of each prism. The base of each figure is shaded.

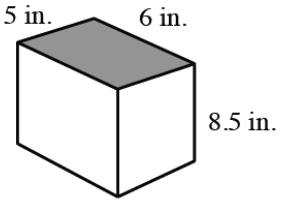
1. Rectangular Prism



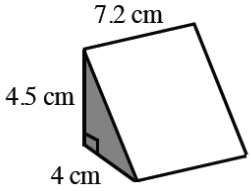
2. Right Triangular Prism



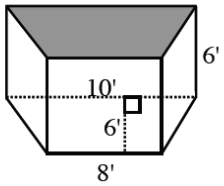
3. Rectangular Prism



4. Right Triangular Prism



5. Trapezoidal Prism



6. Triangular Prism with $B = 15\frac{1}{2}$ cm^2